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Docket No.: 0941-0938PUS1

Application No. 10/810,619
Amendment dated November 28, 2006
Reply to Office Action of August 28, 2006

REMARKS

Claims 1-31 remain present in this application. Reconsideration of the application is respectfully requested.

Rejection under 35 USC 102

Claim 1 stands rejected under 35 USC 102(b) as being anticipated by Masayuki et al., Japanese document 02-014512. This rejection is respectfully traversed.

Independent claim 1 recites (emphasis added):

1. An apparatus for removing metal from a wafer edge, comprising:
a bath tank containing a chemical bath for metal etching;
a rotatable wafer chuck holding a wafer vertical to the chemical bath from a center portion thereof, *wherein at least an edge portion of the wafer is covered with a metal layer;* and
a sliding element disposed on one end of the rotatable wafer chuck such that the rotatable wafer chuck is removable in a vertical direction to the chemical bath and only the edge portion of the wafer is immersed in the chemical bath.

It is respectfully submitted that Masayuki et al. neither teaches nor suggests the apparatus of the present application. As is discussed in lines 6-18 and Fig. 2 of Masayuki et al., a wafer 14 is fixed onto a vacuum chuck 11. A resist 21 is dropped onto the wafer 14 from a resist discharge nozzle 20. An outer peripheral edge of the wafer 14 can be immersed in a resist removal liquid 12a filled in a tank (not titled). No description related to metal etching is provided in Masayuki. It is therefore respectfully submitted that Masuyuki fails to teach or suggest *a bath tank containing a chemical bath for metal etching or at least an edge portion of the wafer being covered with a metal layer*, as is disclosed in independent claim 1 of the present application.

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Reconsideration and withdrawal of the 35 USC 102 rejection are therefore respectfully requested.

Rejections under 35 USC 103

Claims 2-13 stand rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Berdan et al., U.S. Patent 3,898,095. This rejection is respectfully traversed.

Claims 14, 15, 24, 26, and 29-31 stand rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Brown et al., U.S. Publication 2003/0209255. This rejection is respectfully traversed.

Claim 23 stands rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Ching et al. This rejection is respectfully traversed.

Claims 14, 15, 24 and 26-31 stand rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Brown et al., U.S. Publication 2003/0209255. This rejection is respectfully traversed.

Claims 16-22 stand rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Brown et al and further in view of Berdan et al. This rejection is respectfully traversed.

Claim 25 stands rejected under 35 USC 103 as being anticipated by Masayuki et al. in view of Brown et al and further in view of Dunn, U.S. Patent 6,539,963. This rejection is respectfully traversed.

Claim 23 stands rejected under 35 USC 103 as being anticipated by Masayuki et al in view of Brown et al and further in view of Erk et al., U.S. Patent 5,593,505. This rejection is respectfully traversed.

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Independent Claim 1

As noted above, independent claim 1 recites (emphasis added):

1. An apparatus for removing metal from a wafer edge, comprising:
a bath tank containing a chemical bath for metal etching;
a rotatable wafer chuck holding a wafer vertical to the chemical bath from a center portion thereof, *wherein at least an edge portion of the wafer is covered with a metal layer;* and
a sliding element disposed on one end of the rotatable wafer chuck such that the rotatable wafer chuck is removable in a vertical direction to the chemical bath and only the edge portion of the wafer is immersed in the chemical bath.

As discussed above, *Masayuki et al.* fails to teach or suggest the apparatus of the present application. The secondary reference to *Berdan et al.* fails to overcome the above-noted deficiencies of the primary reference.

Further, the present application selectively etches metal layers formed at the edge portion of a wafer to thereby reduce a possible particle source to the sequential processing thereof (see page 10 of the specification). The apparatus set forth in independent claim 1 of the present application provides the advantages of selective removal of metal residue at a wafer bevel and reducing particle issue during the following processes.

Accordingly, it is respectfully submitted that the prior art utilized by the Examiner, either alone or in combination, fails to teach or suggest the apparatus of independent claim 1 and its dependent claims.

Independent Claim 14

Independent claim 14 recites (emphasis added):

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14. A method for removing metal from a wafer edge, comprising the steps of:

providing a wafer with a metal layer at least covering an edge portion thereof held by a rotatable wafer chuck from a center portion thereof;

vertically immersing only the edge portion of the wafer into a chemical bath for etching the metal layer; and

rotating the rotatable wafer chuck to remove the metal layer at only the edge portion from the surface and the edge of the wafer.

Under MPEP 2143, to establish a prima facie case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Independent claim 14 recites a combination of steps including "*providing a wafer with a metal layer at least covering an edge portion thereof*" and "*vertically immersing only the edge portion of the wafer into a chemical bath for etching the metal layer*". It is respectfully submitted that the prior art utilized by the Examiner, either alone or in combination, fails to teach or suggest the method of independent claim 14 and its dependent claims.

As mentioned and disclosed in lines 6-18 and Fig. 2 of Masayuki et al., a wafer 14 is fixed onto a vacuum chuck 11. A resist 21 is dropped onto the wafer 14 from a resist discharge nozzle 20. An outer peripheral edge of the wafer 14 can be immersed in a resist removal liquid 12a filled in a tank (not titled). No description related to metal etching is taught or suggest in Masayuki.

In addition, Ching et al. teaches an apparatus for processing wafers by immersion thereof into a stripping chemical (see Figs. 1, 3B, 4B, 5B, and 6B). Brown et al. teaches a method for cleaning a backside of a wafer by a scrubber device, but requires no chemical bath therein (see Fig. 1). It is therefore respectfully submitted that Masayuki et al, Ching et al, or Brown et al., either alone or in combination, teaches or suggests selectively removing metal layers formed at

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the edge portion of a wafer, as is disclosed in independent claim 14 of the present application, to thereby reduce a possible particle source to the sequential processing thereof. The method of independent claim 14 provides the advantage of selective removal of metal residue at a wafer bevel and reducing particle issue during the following processes.

The secondary references utilized by the Examiner fail to overcome the above-noted deficiencies of the primary references.

Accordingly, it is respectfully submitted that the prior art utilized by the Examiner, either alone or in combination, fails to teach or suggest the method of independent claim 14 and its dependent claims.

Summary

In view of the foregoing amendments and remarks, it is respectfully submitted that the prior art utilized by the Examiner fails to teach or suggest the apparatus and method of independent claims 1 and 14, respectively, as well as their dependent claims. Reconsideration and withdrawal of the 35 USC 102 and 103 rejections are respectfully requested.

Conclusion

Favorable reconsideration and an early Notice of Allowance are earnestly solicited.

Because the additional prior art cited by the Examiner has been included merely to show the state of the prior art and has not been utilized to reject the claims, no further comments concerning these documents are considered necessary at this time.

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In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 205-8000 in the Washington, D.C. area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: November 28, 2006

Respectfully submitted,

By 

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